I. BIOGRAPHY

Since 1999, David Goodman has been a Professor of Electrical and Computer Engineering at Polytechnic University in Brooklyn, New York. He currently holds a temporary position as Program Director in the Computer and Network Systems Division of the National Science Foundation. Before joining the NSF in February 2006, he was Director of the Wireless Internet Center for Advanced Technology, a National Science Foundation Industry/University Cooperative Research Center at Polytechnic University, Columbia University, and University of Virginia. Until August 2001, he was Head of the Electrical and Computer Engineering Department at Poly.

Prior to joining Poly, Dr. Goodman was a professor at Rutgers University, where he founded the Wireless Information Network Laboratory (WINLAB) in 1989. He was WINLAB Director until he moved to Brooklyn Poly. In 1995, he was a Research Associate at the Program on Information Resources Policy at Harvard University. In 1997, he was Chairman of the National Research Council Committee studying "The Evolution of Untethered Communications." From 1967 to 1988 he was at Bell Laboratories, where he was Department Head in Communications Systems Research. He has made fundamental contributions to digital signal processing, speech coding, and wireless information networks.

Dr. Goodman is a member of the National Academy of Engineering and a foreign member of The Royal Academy of Engineering, a Fellow of the Institute of Electrical and Electronic Engineers, and a Fellow of the Institution of Electrical Engineers. In 1997, he received the ACM/SIGMOBILE Award for "Outstanding Contributions to Research on Mobility of Systems Users, Data, and Computing". In 1999 he won the RCR Gold Award for the best presentation at the Conference on Third Generation Wireless Communications. In 2003, he received the Avant Garde award from the Vehicular Technology Society of the IEEE. Three of his papers on wireless communications have been cited as Paper of the Year by IEEE journals.

Dr. Goodman is a frequent public speaker in a variety of forums on wireless communications. He is author of the books "Wireless Personal Communications Systems", published in 1997 by Addison Wesley and co-author, with Roy Yates, of "Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers", published by Wiley in 1998, with a second edition published in 2004. He is a co-editor of six other books on wireless communications. He received a Bachelor's degree at Rensselaer Polytechnic Institute (1960), a Master's at New York University (1962), and a Ph. D. at Imperial College, University of London (1967), all in Electrical Engineering.

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Doctor of Philosophy (Electrical Engineering), 1967
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Master of Electrical Engineering, 1962
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Bachelor of Electrical Engineering, 1960
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National Science Foundation, 2006 - Present
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Head Of Department, 1999-2001

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Director, Wireless Information Network Laboratory (WINLAB), 1989 - 1999
Chair, Department of Electrical and Computer Engineering, 1988 - 1991

Harvard University, 1995
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AT&T Bell Laboratories 1960 - 1962, 1967-1988
Department Head, Communications Systems Research

Imperial College, London, 1983-1988
Visiting Professor of Electrical Engineering

Southampton University, 1987-1990
Visiting Professor of Electronics and Computer Science

IV. HONORS AND AWARDS

Member, National Academy of Engineering

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Fellow, Institute of Electrical and Electronic Engineers

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2003 IEEE Avant Garde Award for Contributions to Speech Coding and Internet-Packet Cellular Networks

1999 RCR Gold Award for Best Talk at Wireless Technology Conference

1997 ACM Award for Outstanding Contributions to Research on Mobility of Systems, Users, Data and Computing

Paper of the Year: IEEE Transactions on Vehicular Technology: 1992

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EXHIBIT B

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CERTIFICATE OF SERVICE

I, Rachel Pernic Waldron, hereby certify that on this 1st day of December, 2006, I served a true and correct copy of the foregoing **EXPERT REPORT OF DR. DAVID GOODMAN ON THE INVALIDITY OF U.S. PATENT NO. 5,327,144** and its accompanying exhibits upon the following individuals in the manner indicated:

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⑲日本国特許庁(JP) ⑪特許出願公開

⑫公開特許公報(A) 平3-239091

⑤Int. Cl.⁵ 識別記号 庁内整理番号 ㊸公開 平成3年(1991)10月24日
H 04 Q 7/04 C 7608-5K

審査請求 未請求 請求項の数 1 (全6頁)

㊿発明の名称 移動体無線通信装置

㉑特 願 平2-36652
㉒出 願 平2(1990)2月16日

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明 細 書

1. 発明の名称

移動体無線通信装置

2. 特許請求の範囲

専用に割当てられた制御チャネルにより送受信機能を有する移動体との無線通信を制御する制御信号を移動体に対して送受信する制御チャネル送受信手段と専用に割当てられたトラフィックチャネルにより移動体に対して通話及び制御のための信号を送受信するトラフィックチャネル送受信手段と共通に割当てられた共通チャネルにより移動体からの位置標定信号を受信する共通チャネル受信手段と上記各手段を制御する制御手段をそれぞれ有する複数の基地局と、上記各基地局の制御手段と通信網との間に接続され、各制御手段との間で通話信号、制御信号を送受信するとともに、上記各位置標定信号中のデータを受信する交換局と、交換局に接続され、上記各データを入力されて移動体の位置を標定する位置標定手段を備えたことを特徴とする移動体無線通信装置。

3. 発明の詳細な説明

〔産業上の利用分野〕

この発明は、交換局及び複数の基地局を有する移動体無線通信装置に関し、特に移動体位置標定機能を有する移動体無線通信装置に関するものである。

〔従来の技術〕

第4図は例えばBSTJ January 1979, Vol. 58, No. 1, Page158, Fig. 4 に示された従来の自動車電話システムの構成を示し、1は交換局、3a～3nは基地局、4a～4nは基地局アンテナ、5は自動車などに設置された移動機、6は移動機アンテナ、11a～11nは各基地局3a～3nの制御装置、12a～12nは各基地局3a～3n毎に専用に割当てられた制御チャネルにより送受信する制御チャネル送受信機、13a～13nはロケータ用受信機、14a～14nは各基地局3a～3n毎に専用に割当てられたトラフィックチャネルにより送受信するトラフィックチャネル送受信機、15a～15nはアンテナ共用器、21は交

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換局1と公衆通信網との接続点、22a～22nは交換局1と基地局3a～3nとの通信回線の接続点、23a～23nはデータ回線の接続点、25a～25nは制御チャネル送受信機12a～12nと制御装置11a～11nとの接続点、26a～26nはロケータ用受信機13a～13nと制御装置11a～11nとの接続点、27a～27n，28a～28nはトラフィックチャネル送受信機14a～14nと制御装置11a～11nとの接続点、29a～29n，30a～30n，31a～31nはそれぞれ制御チャネル送受信機12a～12n、ロケータ用受信機13a～13n及びトラフィックチャネル送受信機14a～14nとアンテナ共用器15a～15nとの接続点である。

次に、動作を説明する。各基地局3a～3nの制御チャネル送受信機12a～12nは各基地局3a～3nの識別信号を含んだ報告信号により変調され、それぞれ異なった無線周波数の搬送波を常時送信している。移動機5は指定された全ての制御チャネルをスキャンし、そのうちの受信電界が最も大きいチャネルに固定して待受ける。ここで、公衆通信網との接続点21にある特定の移動機5に呼び出しがかかったとする。交換局1は基地局3a～3nに対して移動機5を呼び出すよう指令を出し、これを受けて制御装置11a～11nは移動機5を呼びだすため呼び出し信号を制御チャネル送受信機12a～12n及びアンテナ共用器15a～15nを介してアンテナ4a～4nから空間に放射する。移動機5はそのうちの最も電界の強い例えば基地局3aを待ち受けており、基地局3aからの呼び出し信号を受信し、直ちにレスポンス信号を送信する。このレスポンス信号を受信した基地局3aはトラフィックチャネル送受信機14aの空きのトラフィックチャネルを割り当て、通話状態となる。交換局1は基地局3aの指定したトラフィックチャネルと公衆通信網との交換接続を行う。現在のトラフィックチャネルの通信品質が劣化すると、制御装置11aは交換局1を通じて周辺の基地局、例えば基地局3b～3eに現在のトラフィックチャネルの電界の測定を依頼する。電界の測定は各基地局3b～3eのロケータ用受信機13b～13eが行い、仮に基地局3cの電界が最も大きければ交換局1は現在のトラフィックチャネルを通じて移動機5に対して基地局3cの空きトラフィックチャネルと切換えるように指令を行い、公衆通信網の回線を新しいトラフィックチャネルに交換接続する。

又、移動機5から呼び出しがあった場合には、上記と逆の動作を行う。公衆通信網あるいは移動機5のいずれかが終話をすると、交換局1及び制御装置3cは終結動作を行う。

〔発明が解決しようとする課題〕

従来の自動車電話システムは以上のように構成されており、無線回線のアナログ伝送に最適しているが、デジタル伝送（TDMA方式）への移行に際しては基地局3a～3nと移動機5との距離を測定しなければならず、このための装置が必要であった。

この発明は上記のような課題を解決するためになされたものであり、基地局と移動体との距離を測定することができるとともに、さらに移動体の位置標定を行うことができる移動体無線通信装置を得ることを目的とする。

〔課題を解決するための手段〕

この発明に係る移動体無線通信装置は、共通に割当てられた共通チャネルにより移動体からの位置標定信号を受信する共通チャネル受信手段を有する複数の基地局と、この各位置標定信号中のデータを受信する交換局と、交換局に接続され、上記データを入力されて移動体の位置を標定する位置標定手段を設けたものである。

〔作　用〕

この発明において、移動体は各基地局に共通に割当てられた共通チャネルにより位置標定信号を送信し、各基地局の共通チャネル受信機はこの位置標定信号を受信してそのデータを交換局へ送り、交換局はこのデータを位置標定手段へ送り、位置標定手段は移動体の位置を標定する。

〔実施例〕

以下、この発明の実施例を図面とともに説明する。第1図はこの実施例による移動体位置標定装置の構成を示し、2は位置標定計算装置、16a～16nは基地局3a～3n内に設けられた共通チャネル受信機で、各基地局3a～3nに共通に割当てられた共通チャネル12より送受信する。24は交換局1と位置標定計算装置2との接続点、32a～32nは制御装置11a～11nと共通チャネル受信機16a～16nとの接続点、33a～33nは共通チャネル受信機16a～16nとアンテナ共用器15a～15nとの接続点である。他の構成は第4図と同様である。

次に、動作を説明する。各基地局3a～3nの制御チャネル送受信機12a～12nは各基地局3a～3nの識別信号を含んだ報知信号で変調され、それぞれ異なった無線周波数の搬送波を常時送信している。移動機5は指定された全ての制御チャネルをスキャンし、そのうちの受信電界が最も大きいチャネルに固定し、待受けている。例えば、移動機5が基地局3aのゾーン内に位置していれば、制御チャネル送受信機12aからの信号を待受けている。ここで、公衆通信網との接続点21にある特定の移動機5の位置標定の依頼があると、交換局1は基地局3a～3nに対して移動機5の呼び出しと位置標定を指令する。これを受けて、制御装置11a～11nは位置標定呼び出し信号を制御チャネル送受信機12a～12n及びアンテナ共用器15a～15nを介してアンテナ4a～4nから空間に放射する。移動機5は放射された位置標定呼び出し信号のうち最も電界が強い信号を放射した基地局3aの制御チャネルで待受けており、この位置標定呼び出し信号を受信すると直ちにレスポンス信号を送信するとともに共通チャネルに切換えてバースト状のデジタル信号である位置標定信号を送出する。レスポンス信号を受信した基地局3aは、交換局1に移動機5が自局のゾーン内にいることを報告する。又、各基地局3a～3nの共通チャネル受信機16a～16nのうちのいくつかは移動機5からの位置標定信号を受信すると、その中に含まれているユニークワードを相関検波することにより位置標定信号が到着した絶対時間あるいは相対時間を測定し、位置標定信号の各基地局3a～3nへの到着時間差などのデータを制御装置11a～11nを介して交換局1へ報告する。交換局1はこれらのデータを位置標定計算装置2へ転送し、移動機5の位置を計算させる。この場合、共通チャネル受信機16a～16nの設置数が多く、密度が適当であれば、位置標定の精度を十分高くすることができる。

次に、公衆通信網との接続点21に対してある特定の移動機5への通話呼び出しがかかったとする。この場合、交換局1は基地局3a～3nに対して移動機5を呼び出すよう指令する。これを受けて、制御装置11a～11nは移動機5の呼び出し信号を制御チャネル送受信機12a～12n及びアンテナ共用器15a～15nを介してアンテナ4a～4nから空間へ放射する。移動機5は各呼び出し信号のうち最も電界が強い信号を放射する例えば基地局3aの制御チャネルで待受けており、基地局3aからの呼び出し信号を受信し、直ちにレスポンス信号を送信する。レスポンス信号を受信した基地局3aはトラフィックチャネル送受信機14aの空きのトラフィックチャネルを割当て、通話状態となる。交換局1は基地局3aが指定したトラフィックチャネルと公衆通信網との交換接続を行う。ここで、現在のトラフィックチャネルの通信品質が劣化すると、制御装置11aは現在使用しているトラフィックチャネルを介して移動機5に共通チャネルを用いた位置標定信号の送信を指令する。この指令を受けて、移動機5は共通チャネルに切換えて位置標定信号を送信し、現在のトラフィックチャネルに復帰する。共通チャネル受信機16a～16nはこの位置標定信号を受信すると、その中のユニークワードから到着時間を測定し、これらのデータを制御装置11a～11nを介して交換局1に報告する。交換局1はこれらのデータを位置標定計算装置2に報告し、移動機5の位置を標定させる。この位置標定結果により、例えば移動機5が基地局3cの

ゾーン内にあった場合には、交換局1は基地局3cの制御装置11cに対して空きトラフィックチャネルを問い合せ、また移動機5に対して基地局3cの空きトラフィックチャネルに切換えるように指令を行い、公衆通信網の回線を新しいトラフィックチャネルに交換接続する。なお、接続点22a～22nは通話信号用であり、接続点23a～23nはデータ又は制御信号用である。移動機5からの発呼の場合は、上記と逆の動作を行う。公衆通信網又は移動機5のいずれかが終結すると、交換局1及び制御装置11cは終結動作を行う。

第2図は共通チャネル受信機16a～16nの構成を示し、41は高周波フィルタ、42は高周波アンプ、43は第1ミキサ、44は第1局発周波数を発生するシンセサイザ、45は第1中間周波フィルタ、46は第1中間周波アンプ、47は第2ミキサ、48は第2局発周波数を発生する水晶発振器、49は第2中間周波フィルタ、50は第2中間周波アンプ、51は検波・復号器、52はユニークワード検出回路、53は時間測定回路、54は標準時計、55は制御回路である。

第2図の構成において、アンテナ共用器15との接続点33に位置標定信号で変調された高周波信号が入力されると、高周波フィルタ41で選択され、高周波アンプ42で増幅され、第1ミキサ43でシンセサイザ44の出力と混合され、第1中間周波数に変換される。その後、第1中間周波フィルタ45で選択され、第1中間周波アンプ46で増幅され、第2ミキサ47で第2局発の水晶発振器48の出力と混合され、第2中間周波数に変換される。さらに、第2中間周波フィルタ49で選択され、第2中間周波アンプ50で増幅され、検波・復号器51で位置標定信号に復号される。位置標定信号には14ビット程度のユニークワードが含まれており、ユニークワード検出回路52では元のユニークワードとの相関を検出し、相関がピークになった時点で時間測定回路53にトリガをかける。標準時計54は超高精度の時計であり、時間測定回路53は上記トリガの絶対時間を測定し、制御回路55から制御装置11を介して交換局1に報告する。又、逆に標準時計54は交換局1により時間補正される。ユニークワードの相関検出は$\frac{1}{50}$ビット程度の精度であるため、ユニークワードのビットレートを50kbpsとすると、$(1\mathrm{sec} \div 50\mathrm{kbps}) \times \frac{1}{50} \fallingdotseq 0.4\mu\mathrm{s}$の精度であり、移動機5の標定精度は120m程度となる。ビットレートを500kbpsとすると、標定精度は12m程度まで改善される。

第3図はこの発明の第2の実施例による移動体無線通信装置の構成を示し、7a～7kは位置標定局、8a～8kはそのアンテナ、17a～17kは制御装置、18a～18kは同じく共通チャネル受信機、34a～34kは交換局1と制御装置17a～17kとの接続点、35a～35kは共通チャネル受信機18a～18kとアンテナ8a～8kとの接続点である。他の構成は第1図と同様である。

第3図の構成において、位置標定局7a～7kは移動機5の位置を標定するときの精度を向上するために設けられたものであり、移動機5が共通チャネルで位置標定信号を送信したとき、その到着時間を測定し、そのデータを交換局1に報告する。交換局1は各基地局3a～3nからのデータと位置標定局7a～7kからのデータを位置標定計算装置2へ転送し、移動機5の位置を計算させる。他の動作は第1図と同様である。

なお、上記各実施例においては、共通チャネルについては受信機16a～16nのみを設けたが、これを送受信機としても同様の効果が得られ、その上移動機5とのメッセージ通話が可能となる。

〔発明の効果〕

以上のようにこの発明によれば、自動車電話システムなどにおいて、各基地局に共通チャネル受信手段を設けるとともに、交換局に移動体位置標定手段を接続することにより、基地局と移動体との距離測定を可能にして無線回路のデジタル伝送を可能にするとともに、移動体の位置を標定することができる。

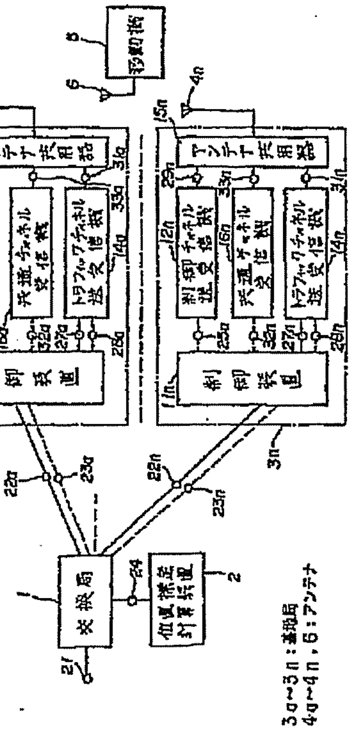
4. 図面の簡単な説明

第1図及び第2図はこの発明の第1の実施例による移動体無線通信装置の構成図及びその共通チャネル受信機の構成図、第3図はこの発明装置の第2の実施例による構成図、第4図は従来装置の構成図である。

1…交換局、2…位置推定計算装置、3a～3n…基地局、4a～4n，6…アンテナ、5…移動機、11a～11n…制御装置、12a～12n…制御チャネル送受信機、14a～14n…トラフィックチャネル送受信機、16a～16n…共通チャネル受信機。

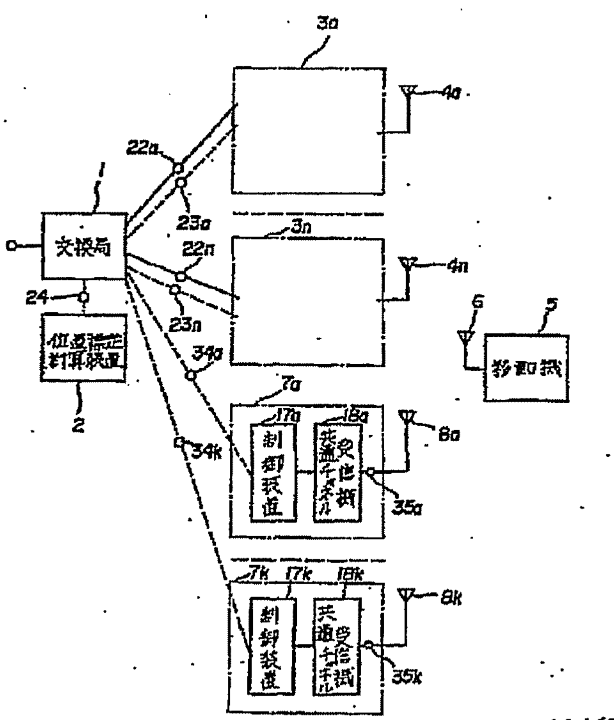
なお、図中同一符号は同一又は相当部分を示す。

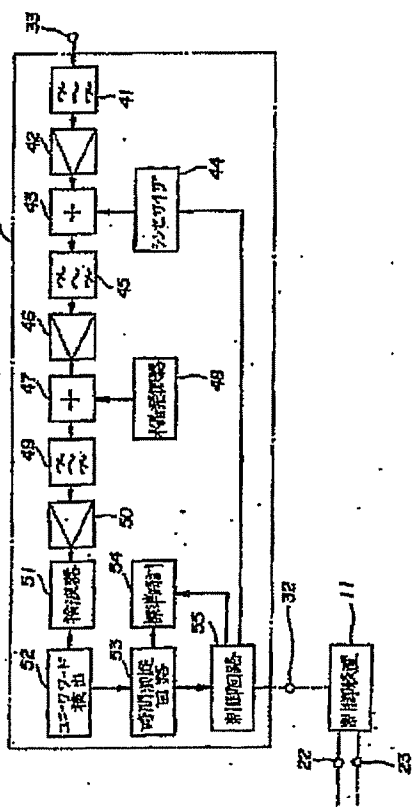
代理人　大岩増雄



第1図

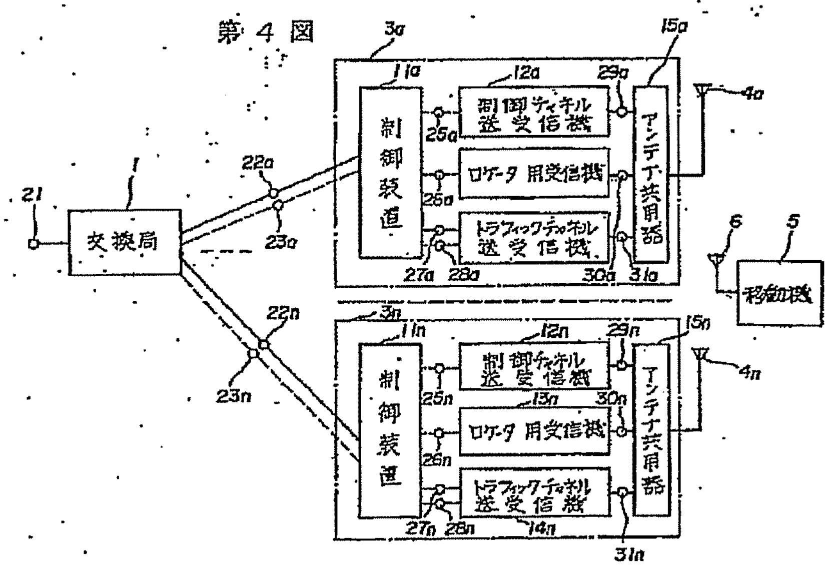
第3図





第2図

第4図


交換局
制御装置
制御チャネル送受信機
ロケータ用受信機
トラフィックチャネル送受信機
アンテナ共用器
移動機
制御装置
制御チャネル送受信機
ロケータ用受信機
トラフィックチャネル送受信機
アンテナ共用器

DRAFT TRANSLATION

English Translation of Japanese Laid-open Patent Application

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(43) Kokai (Laid-Open) Publication Date: October 24, 1991
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Request for Examination: None submitted
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H04Q 7/04	C	7608-5K

(54) MOVING BODY RADIO COMMUNICATION APPARATUS

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SPECIFICATION

1. Title of the Invention

Moving Body Radio Communication Apparatus

2. Claims

Moving body radio communication apparatus, characterized in being equipped with control channel transceivers that transmit to and receive from a moving body control signals for controlling radio communication with a moving body having the capacity to transmit and receive using control channels that are specifically allocated, and a traffic channel transceiver means that transmit and receive signals for communication and control with respect to a moving body using traffic channels that are specifically allocated, and a plurality of base stations possessing control means that control the aforementioned means and a shared channel reception means that receives position locating signals from a moving body using shared channels that are specifically allocated, and a switching station that receives data in the aforementioned position locating signals and that transmits and receives communications signals and control signals between the control means, with there being a connection between a telecommunications network and the control means of the above-mentioned bases, and a position locating means that locates the position of a moving body, being connected to the switching station.

3. Detailed Description of the Invention

Field of Industrial Use

This invention relates to a moving body radio communication apparatus possessing a switching station and a plurality of base stations, and in particular, this invention relates to a moving body radio communication apparatus possessing a moving body position locating function.

Prior Art

FIG. 4 shows a configuration of a prior art automobile telephone system, as described, for example in *BSTJ*, January 1979, Vol. 58, No. 1, Page 158, Fig. 4, where ***1*** is a switching station; ***3a – 3n*** are base stations; ***4a – 4n*** are base station antennas; ***5*** is mobile equipment located in an automobile or the like; ***8*** is an antenna for mobile equipment; ***11a – 11n*** are control devices for the base stations ***3a – 3n***; ***12a – 12n*** are control channel transceivers that transmit and receive signals for the control channels allotted for each of the base stations ***3a – 3n***; ***13a – 13n*** are locator receivers; ***14a – 14n*** are traffic channel transceivers that transmit and receive signals for traffic channels allotted for each of the base stations ***3a – 3n***; ***15a – 15n*** are antenna-sharing devices; ***21*** is a junction point between the switching station ***1*** and the public telecommunications network; ***22a – 22n*** are telecommunication circuit junction points between the switching station ***1*** and the base stations ***3a – 3n***; ***23a – 23n*** are data circuit junction points; ***25a – 25n*** are junction points between the control channel transceivers ***12a – 12n*** and the control devices ***11a – 11n***; ***26a – 26n*** are junction points between the locator receivers ***13a – 13n*** and the control devices ***11a – 11n***; ***27a – 27n*** and ***28a – 28n*** are junction points between the traffic channel transceivers ***14a – 14n*** and the control devices ***11a – 11n***; and ***29a – 29n***, ***30a – 30n***, and ***31a – 31n*** are junction points between the control channel transceivers ***12a – 12n***, the locator receivers ***13a – 13n***, and the traffic channel transceivers ***14a – 14n***, respectively, and the antenna-sharing devices ***15a – 15n***.

Next, the operation is described. The control channel transceivers ***12a – 12n*** of the base stations ***3a – 3n*** are modulated by reporting signals that include identifier signals from the base stations ***3a – 3n***, and the carrier waves of the respectively differing radio frequencies are continuously transmitted. The mobile equipment ***5*** scans all of the designated control channels, fixes to the one with the largest reception electrical field, and stands by. At this point, suppose that a call was made to a specific mobile equipment ***5*** at the junction point ***21*** connecting to the public telecommunications network. The switching station ***1*** issues a command to the base station ***3a – 3n*** to call the specified mobile equipment ***5***, and when this is received, the control device ***11a – 11n*** radiates a call signal in the space from the antenna ***4a – 4n*** via the control channel transceivers ***12a – 12n*** and the antenna-sharing devices ***15a – 15n*** to call the mobile equipment ***5***. The mobile equipment ***5*** stands by to receive the strongest electrical field, for example, from the base station ***3a***, and receives the call signal from the base station ***3a***, and immediately transmits a response signal. The base station ***3a*** which receives the response signal allots an empty traffic channel of the traffic channel transceivers ***14a***, establishing a state of voice communication. The switching station ***1*** establishes a switching connection between the

traffic channel designated by the base station *3a*. If the voice communication quality of the current traffic channel degrades, then the control device *11a* relies on the measurement of the electrical field of the current traffic channel by a nearby base station, e.g., the base station *3b – 3e*, via the switching station *1*. Measurement of the electrical field is carried out by the locator receiver *13b – 13e* of the base station *3b – 3e*, and supposing that the electrical field of the base station *3c* is the largest, then the switching station *1* will issue a command to the mobile equipment *5* via the current traffic channel to switch to an idle traffic channel of the base station *3c*, thereby switching and connecting the circuit of the public telecommunications network to a new traffic channel. Furthermore, if there is a call from the mobile equipment *5*, the operation is the reverse of that described above. If either the public telecommunications network or the mobile equipment *5* terminates, then the switching station *1* and the control device *3c* terminate operation.

Problems to be Solved by the Invention

The prior art automobile telephone system had a constitution as described above, and was suited for wireless radio analog transmission, and when migrating to digital transmission (TDMA format), the distance between the base station *3a – 3n* and the mobile equipment *5* had be measured, and equipment was needed for that.

This invention was devised to solve the above-mentioned problem, and has as its object to make it possible to measure the distance between a base station and a moving body, and also to produce a moving body radio communication apparatus that can locate the position of a moving body.

Means for Solving These Problems

The moving body radio communication apparatus of this invention is provided with a plurality of base stations that possess a shared channel reception means that receives position locating signals from a moving body using shared channels that are allotted jointly, a switching station that receives data in the form of these position locating signals, and a position locating means that is connected to the switching station, inputs the above-mentioned data, and locates the position of a moving body.

Operation of the Invention

In this invention, a moving body transmits position locating signals using shared channels allotted jointly to the base stations, the shared channel transceivers of the base stations receive these position locating signals and transmit the data to the switching stations, the switching stations transmit this data to a position locating means, and the position locating means locates the position of the moving body.

Working Examples

A working example of this invention is described below with drawings. FIG. 1 shows a configuration of a moving body position locating apparatus in accordance with this working

example, where reference numeral *2* is a position location calculating device, ***16a – 16n*** are shared channel receivers provided within the base stations ***3a – 3n***, which transmit to and receive from a shared channel *12* allotted jointly to the base stations *3a – 3n*. Reference numeral *24* is a junction point between the switching station *1* and the position location calculating device *2*; ***32a – 32n*** are junction points between control devices ***11a – 11n*** and the shared channel receivers ***16a – 16n***; ***33a – 33n*** are junction points between the shared channel receivers ***16a – 16n*** and antenna-sharing devices ***15a – 15n***. The rest of the configuration is identical to that of FIG. 4.

Next, the operation is described. The control channel transceivers *12a – 12n* are modulated by announcing signals that contain identifier signals of the base stations ***3a – 3n***, and the carrier waves of the respectively differing radio frequencies are continuously transmitted. The mobile equipment *5* scans all of the designated control channels, fixes to the one with the largest reception electrical field, and stands by. For example, if the mobile equipment *5* is positioned within the zone of the base station *3a*, it waits for signals from the control channel transceiver *12a*. At this point, if there is a request to locate the position of a specific mobile equipment *5* at the junction point *21* connecting to the public telecommunications network, then the exchange station *1* issues a command to the base stations *3a – 3n* to call and locate the position of the mobile equipment *5*. When this is received, the control device ***11a – 11n*** radiates a call signal in the space from the antenna *4a – 4n* via the control channel transceivers ***12a – 12n*** and the antenna-sharing devices *15a – 15n* to call the mobile equipment *5*. The mobile equipment *5* stands by to receive the signal with strongest electrical field from among the radiated position locating call signals radiated by the base station *3a*, using the control channel, and when this position locating call signal is received, it immediately transmits a response signal, switching to a shared channel and emitting a position locating signal which is a burst digital signal. The base station *3a* that receives the response signal reports to the switching station *1* that the mobile equipment *5* is within its own zone. Furthermore, when some of the shared channel receivers ***16a – 16n*** of the base stations ***3a – 3n*** receive the position locating signal from the mobile equipment *5*, the absolute time or the relative time when the position locating signal arrives is determined by correlation detecting the unique word contained therein, and reports to the switching station *1* via the control devices ***11a – 11n*** data such as the difference in arrival time of position locating signals with respect to the various base stations ***3a – 3n***. The base station *1* forwards these data to the position location calculating device *2*, and the position of the mobile equipment *5* is calculated. In this case, if there are many [illegible] values of the shared channel receivers ***16a – 16n***, and if the density is suitable, the accuracy of the position locating can be quite high.

Next, suppose that a call is made to a specific mobile equipment *5* at the junction point *21* connecting to the public telecommunications network. In this case, the switching station *1* issues a command to the base station ***3a – 3n*** to call the specified mobile equipment *5*. When this is received, the control device ***11a – 11n*** radiates a call signal in the space from the antenna *4a – 4n* via the control channel transceivers *12a – 12n* and the antenna-sharing devices ***15a – 15n*** to call the mobile equipment *5*. The mobile equipment *5* stands by to receive the signal with the strongest electrical field from among the call signals, for example, standing by with the control channel of the base station ***3a***, receives the call signal from the base station *3a*, and immediately transmits a response signal. The base station *3a* which receives the response signal allots an idle traffic channel of the traffic channel transceivers ***14a***, establishing a state of voice

communication. The switching station *1* establishes a switching connection between the traffic channel designated by the base station *3a*. At this point, if the voice communication quality of the current traffic channel degrades, then the control device *11a* issues a command to the mobile equipment *5* to transmit a position locating signal using a shared channel via the currently used traffic channel. When this command is received, the mobile equipment *5* switches to a shared channel and transmits a position locating signal, returning to the current traffic channel. When the shared channel receivers *16a – 16n* receives this position locating signal, it determines the arrival time from the unique word therein, and reports these data to the switching station *1* via the control devices *11a – 11n*. The switching station *1* reports these data to the position location calculating device *2*, establishing the position of the mobile equipment *5*. In accordance with these position location results, if, for example, the mobile equipment *5* is within the zone of the base station *3c*, the switching station *1* posts an inquiry to the control device *11c* of the base station *3c* as to an idle traffic channel, and issues a command to the mobile equipment *5* to switch to an idle traffic channel of the base station *3c*, thereby switching and connecting the circuit of the public telecommunications network to a new traffic channel. It should be noted that the junction points *22a – 22n* are used for voice communication signals, and the junction points *23a – 23n* are used for data or control signals. If a call originates from the mobile equipment *5*, the operation is the reverse of that described above. If either the public telecommunications network or the mobile equipment *5* terminates, then the switching station *1* and the control device *11c* terminate operation.

FIG. 2 shows a configuration of the shared channel receivers *16a – 16n*, and *41* is a high-frequency filter, *42* is a high-frequency amp, *43* is a primary mixer, *44* is a synthesizer that generates a primary local frequency, *45* is a primary intermediate frequency filter, *46* is a primary intermediate frequency amp, *47* is a secondary mixer, *48* is a crystal oscillator that generates a secondary local frequency, *49* is a secondary intermediate frequency filter, *50* is a secondary intermediate frequency amp, *51* is a detector/decoder, *52* is a unique word detection circuit, *53* is a time measurement circuit, *54* is a standard clock, and *55* is a control circuit.

In the configuration of FIG. 2, when a high-frequency signal modulated by a position locating signal is input to the junction point *33* connecting to the antenna-sharing devices *15*, it is selected by the high-frequency filter *41*, amplified by the high-frequency amp *42*, mixed with the output of the synthesizer *44*, using the primary mixer *43*, and converted to a primary intermediate frequency. After that, it is selected by the primary intermediate frequency filter *45*, amplified by the intermediate frequency amp *46*, mixed with the output of the secondary local frequency crystal oscillator *48*, using the secondary mixer *47*, and converted to a secondary intermediate frequency. Moreover, it is selected by the secondary intermediate frequency filter *49*, amplified by the secondary intermediate frequency amp *50*, and decoded to a position locating signal using the detector/decoder *51*. The position locating signal includes a unique word on the order of 14 bits, and the unique word detection circuit *52* detects the correlation with the original unique word, and when the correlation reaches a peak, the time measurement circuit *53* is triggered. The standard clock *54* is an ultra-high precision clock, and the time measurement circuit *53* measures the absolute time of the above-mentioned trigger, and reports it to the switching station *1* from the control circuit *55* via the control device *11*. Furthermore, conversely, the time of the standard clock *54* is corrected by the switching station *1*. Since the unique word correlation detection is accurate to a level of 1/50 bit, if the bit rate of the unique

word is 50 kbps, then the precision is (1 sec + 50 kbps) x 1/50 = 0.4 [illegible], so the precision in locating the mobile equipment *5* is on the order of 120 m. If the bit rate is 500 kbps, then the location precision is improved by about 12 m.

FIG. 3 shows a configuration of a moving body radio communication apparatus of a second working example of this invention, and *7a – 7k* are position locating stations, ***8a – 8k*** are antennas thereof, ***17a – 17k*** are control devices, ***18a – 18k*** are shared channel receivers, and ***34a – 34k*** are contact points between the shared channel receivers ***18a – 18k*** and the antennas ***8a – 8k***. The rest of the configuration is identical to that of FIG. 1.

In the configuration of FIG. 3, the position locating stations *7a -7k* are provided to increase the accuracy of locating the position of the mobile equipment *5*, and when the mobile equipment *5* transmits a position locating signal using a shared channel, the arrival time is measured, and the data is reported to the switching station *1*. The switching station *1* transmits the data from the base stations ***3a – 3n*** and the data from the position locating stations *7a – 7k* to the position location calculating device *2*, causing the position of the mobile equipment *5* to be calculated. The rest of the configuration is identical to that of FIG. 1.

It should be noted that in the above working examples, with regard to the shared channels, only the receivers ***16a – 16n*** were provided, but even if these were transceivers, the same results would be obtained, and moreover, messages could be left with the mobile equipment *5*.

Advantageous Effects of the Invention

In accordance with the invention as described above, it is possible to locate the position of a moving body and determine the distance between a base station and a moving body and digitally transmit with a radio circuit by providing a car telephone system with base stations and a shared channel receiving means, and connecting a moving body position location means to a switching station.

4. Detailed Description of the Drawings

FIG. 1 and FIG. 2 are schematic diagrams of a moving body radio communication apparatus of the first working example and of a shared channel receiving means. FIG. 3 is a schematic diagram of working example 2 of this invention. FIG. 4 is a schematic diagram of a prior art device.

1 .... Switching station
2 .... Position location calculating device
3a – 3n .... Base stations
4a – 4n, 6 .... Antennas
5 .... Mobile equipment
11a – 11n .... Control devices
12a – 12n .... Control channel transceivers
14a – 14n .... Traffic channel transceivers

16a – 16n .... Shared channel receivers

It should be noted that the reference numerals in the drawings show identical or corresponding parts

Agent: Masuo OIWA

FIG. 1

FIG. 2

FIG. 3

FIG. 4

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TRUEPOSITION INC., PLAINTIFF/ COUNTERCLAIM- DEFENDANT, v. ANDREW CORPORATION, DEFENDANT/ COUNTERCLAIM-PLAINTIFF.	))))))))))))	CIVIL ACTION NO. O5-OO747-SLR

ANDREW CORPORATION'S SUPPLEMENTAL RESPONSES TO TRUEPOSITION'S FIRST SET OF INTERROGATORIES

Pursuant to Rules 26(e) and 33 of the Federal Rules of Civil Procedure, Andrew Corporation hereby supplements its responses to TruePosition's First Set of Interrogatories. Pursuant to Rule 26(e) of the Federal Rules of Civil Procedure, Andrew expressly reserves the right to supplement these responses further.

Interrogatory No. 1

Identify by name, trade designation. and/or model number. each line, type, or version of Cellular Telephone Location System, or component thereof, made, used. sold, or offered for sale in or from the United States, or imported into the United States, by Andrew since January 1, 2004, and identify, separately, the Person most knowledgeable at Andrew with respect to such manufacture, use, sale, offer for sale, and/or importation of each identified Cellular Telephone Location System or component, and the Person most knowledgeable at Andrew with respect to the U-TDOA functionality of each identified Cellular Telephone Location System or component.

regardless of how TruePosition tries to interpret the '144 Patent claims, as also explained in Andrew's response to Interrogatory No. 3.

Andrew reserves the right to supplement and/or amend its response to this interrogatory once additional facts are known and as the litigation progresses.

Interrogatory No. 6

State whether Andrew received any legal advice, written or oral, relating to the '144 Patent, the date(s) the advice was received, the author(s) of the advice, the recipient(s) of the advice, any Person(s) at Andrew other than the recipient(s) told of or who received a copy of the advice, the date(s) when Person(s) at Andrew other than the recipient(s) were told or received a copy of the advice, whether Andrew relied on such advice to engage in, or refrain from engaging in, any business activity(ies), including whether Andrew relied on the advice in bidding on the RFP issued by STC referred to in Andrew's Answer, the business activity(ies) that Andrew engaged in, or refrained from engaging in, in reliance on the advice, and the substance of all the advice received.

Response:

Subject to and without waiving its General Objections, Andrew states that, except for advice from in-house attorneys, litigation counsel and its regular outside patent counsel, it has not received any legal advice relating to the '144 Patent. Andrew further states the Scheduling Order sets a date of September 8, 2006 for Andrew to disclose whether it intends to rely on an opinion of counsel defense and produce documents pertaining to that defense.

Interrogatory No. 7

State the factual basis for the allegations in the First Affirmative Defense and paragraph 9 in the Counterclaims section of Andrew's Answer that the '144 Patent and each of its claims are invalid and/or unenforceable under one or more sections of Title 35 of the United States Code, including §§ 101, 102, 103, and/or 112," including the identity of each section of Title 35 of the United States Code under which the '144 Patent and each of its claims are allegedly invalid and/or unenforceable, which claims of the '144 Patent are allegedly invalid and/or unenforceable under each section of Title 35 identified, the prior art, if any, that allegedly renders each claim of the '144 Patent invalid and/or unenforceable under each section of Title 35 identified, and how such prior art allegedly renders each claim of the '144 Patent invalid and/or unenforceable under each section of Title 35 identified.

Response:

Subject to and without waiving the foregoing general objections, Andrew states that: (i) each claim of the '144 Patent is invalid either as anticipated under 35 U.S.C. § 102 or as obvious under 35 U.S.C. § 103 in light of prior art included in the documents Andrew produces in response to TruePosition's document requests; and (ii) each claim of the '144 Patent is invalid under 35 U.S.C. § 112 due to lack of enabling disclosure.

Andrew is still in the process of conducting its inquiry into the facts and circumstances at issue in the present litigation and reserves the right to continue to supplement its response to this interrogatory as the litigation progresses.

Interrogatory No. 8

State the factual basis for the allegation in the Third Affirmative Defense of Andrew's Answer that "TruePosition is barred from maintaining its claims for infringement by the defense of equitable estoppel."

Response:

Subject to and without waiving its General Objections, Andrew states:

The European Telecommunications Standards Institute ("ETSI") IPR Policy imposes an obligation for each member to use its reasonable efforts to timely inform ETSI of essential IPR that it becomes aware of. The ETSI IPR Policy imposes an additional obligation on any member who submits a technical proposal for a standard or a technical specification to inform ETSI of its ownership of any IPR which might be an Essential IPR if that proposal is adopted. An IPR is an "Essential IPR" under ETSI's IPR Policy if it is not possible on technical grounds to implement the standard without infringing that IPR.

TruePosition is, and has been at all relevant times, a member of ETSI. Through its membership, TruePosition has agreed to comply with ETSI's IPR Policy.

Dated: June 23, 2006

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CERTIFICATE OF SERVICE

I, Rachel Pernic Waldron, hereby certify that on this 23rd day of June, 2006, I served a true and correct copy of the foregoing **Andrew Corporation's Supplemental Responses To TruePosition's First Set Of Interrogatories** upon the following individuals in the manner indicated:

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TRUEPOSITION, INC., PLAINTIFF/ COUNTERCLAIM- DEFENDANT, v. ANDREW CORPORATION, DEFENDANT/ COUNTERCLAIM-PLAINTIFF.	)	**CIVIL ACTION NO. O5-OO747-SLR**

ANDREW CORPORATION'S SUPPLEMENTAL RESPONSES TO TRUEPOSITION'S INTERROGATORY NOS. 3 AND 7

Pursuant to Rules 26(e) and 33 of the Federal Rules of Civil Procedure, Andrew Corporation hereby supplements its responses to TruePosition's Interrogatory Nos. 3 and 7. Pursuant to Rule 26(e) of the Federal Rules of Civil Procedure, Andrew expressly reserves the right to supplement these responses further.

Interrogatory No. 3

State the factual basis for the allegation in paragraph 8 of the Counterclaims section of Andrew's Answer that "Andrew has not infringed the '144 Patent, and Andrew's supply of services and/or equipment has not infringed and will not infringe the '144 Patent."

Response:

Subject to and without waiving its General Objections, Andrew responds as follows:

TruePosition accuses Andrew of infringing only claims 1, 2, 22, 31 and 32 of the '144 Patent. *See* Plaintiff's Seventh Supplemental Responses to Defendants' First Interrogatories.

Interrogatory No. 7

State the factual basis for the allegations in the First Affirmative Defense and paragraph 9 in the Counterclaims section of Andrew's Answer that the '144 Patent and each of its claims are invalid and/or unenforceable under one or more sections of Title 35 of the United States Code, including §§ 101, 102, 103, and/or 112," including the identity of each section of Title 35 of the United States Code under which the '144 Patent and each of its claims are allegedly invalid and/or unenforceable, which claims of the '144 Patent are allegedly invalid and/or unenforceable under each section of Title 35 identified, the prior art, if any, that allegedly renders each claim of the '144 Patent invalid and/or unenforceable under each section of Title 35 identified, and how such prior art allegedly renders each claim of the '144 Patent invalid and/or unenforceable under each section of Title 35 identified.

Response:

Subject to and without waiving its General Objections, Andrew responds that the '144 Patent is invalid for at least the following reasons:

Japanese Laid-Open Patent Application Publication No. H3-239091, named inventor Mitsunori Kono (the "Kono reference"), anticipates each claim of the '144 Patent under 35 U.S.C. § 102 and/or renders each claim of the '144 Patent obvious under 35 U.S.C. § 103. The Kono reference was filed February 16, 1990 and published October 24, 1991 -- over a year before the May 7, 1993 filing date of the application for the '144 Patent.

The Kono reference states, "[t]his invention . . . has as its object to make it possible to measure the distance between a base station and a moving body, and also to produce a moving body radio communication apparatus that can locate the position of a moving body." (Kono reference, p. 3). The Kono reference teaches, "[t]he moving body radio communication apparatus of this invention is provided with a plurality of base stations that possess a shared channel reception means that receives position locating signals from a moving body using shared channels that are allotted jointly, a switching station that receives data in the form of these position locating signals, and a position locating means that is connected to the switching station, inputs the above-mentioned data, and locates the position of a moving body." (*Id.*)

The Kono reference also teaches at page 4 (reference numerals omitted):

> The control channel transceivers are modulated by announcing signals that contain identifier signals of the base stations, and the carrier waves of the respectively differing radio frequencies are continuously transmitted. The mobile equipment scans all of the designated control channels, fixes to the one with the largest reception electrical field, and stands by. . . . At this point, if there is a request to locate the position of a specific mobile equipment at the junction point connecting to the public telecommunications network, then the exchange station issues a command to the base stations to call and locate the position of the mobile equipment. When this is received, the control device radiates a call signal in the space from the antenna via the control channel transceivers and the antenna-sharing devices to call the mobile equipment. The mobile equipment stands by to receive the signal with strongest electrical field from among the radiated position locating call signals radiated by the base station, using the control channel, and when this position locating call signal is received, it [the mobile station] immediately transmits a response signal, switching to a shared channel and emitting a position locating signal which is a burst digital station.

In addition, the Kono reference teaches that (reference numerals omitted): "[f]urthermore, when some of the shared channel receivers of the base stations receive the position locating signal from the mobile equipment, the absolute time or the relative time when the position locating signal arrives is determined by correlation detecting the unique word contained therein, and reports to the switching station via the control devices data such as the difference in arrival time of position locating signals with respect to the various base stations. The base station forwards these data to the position location calculating device, and the position of the mobile equipment is calculated." (*Id.*)

The Kono reference also teaches (reference numerals omitted): "position location stations [that] are provided to increase the accuracy of locating the position of the mobile equipment, and when the mobile equipment transmits a position locating signal using a shared channel, the arrival time is measured, and the data is reported to the switching station. The switching station transmits the data from the base stations and the data from the position locating

stations to the position locating calculating device, causing the position of the mobile equipment to be calculated." (*Id.*)

Andrew also refers TruePosition to the claim charts below, which further demonstrate that the Kono reference invalidates each claim of the '144 Patent, particularly if TruePosition tries to read the '144 Patent claims on Andrew's geolocation products.

Claim Language	Kono Invalidates the Asserted Claim
1. A cellular telephone location system for determining the locations of multiple mobile cellular telephones	All of figure 1 and the accompanying description. *See also* page 2, ¶ 2-Page 3, ¶ 1 ("FIG. 4 shows…control device 3c terminate operation.").
each initiating periodic signal transmission over one of a prescribed set of reverse control channels, comprising:	*"12a – 12n* are control channel transceivers that transmit and receive signals for the control channels allotted for each of the base stations *3a – 3n."* Page 2, ¶ 2, ll. 5-6. The mobile cellular telephones taught by Kono each initiate periodic signal transmissions.
(a) at least three cell site systems, each cell site system comprising:	Base stations 3a-3n.
an elevated ground-based antenna;	Antennas 4a-4n.
a baseband convertor operatively coupled to said antenna for receiving cellular telephone signals transmitted over a reverse control channel by said cellular telephones and providing baseband signals derived from the cellular telephone signals;	Control channel transceivers 12a-12n.
a timing signal receiver for receiving a timing signal common to all cell sites;	"…the time of the standard clock *54* is corrected by the switching station *1*." Page 5, ¶ 3, l. 16.
and a sampling subsystem operatively coupled to said timing signal receiver and said baseband convertor for sampling said baseband signal at a prescribed sampling frequency and formatting the sample signal into frames of	Kono teaches software and processors in hardware unit 55 that determine and format time of arrival information. Time stamp bits representing the time at which

Claim Language	Kono Invalidates the Asserted Claim
digital data, each frame comprising a prescribed number of data bits and time stamp bits, said time stamp bits representing the time at which said cellular telephone signals were received; and	the cellular telephone signals are received: "The standard clock *54* is an ultra-high precision clock, and the time measurement circuit *53* measures the absolute time of the above-mentioned trigger, and reports it to the switching station *1* from the control circuit *55* via the control device *11.*" Page 5, ¶ 3. ll. 13-15.
(b) a central site system operatively coupled to said cell site systems, comprising:	Kono teaches a central site system operatively coupled to the cell site systems.
means for processing said frames of data from said cell site systems	"where reference numeral *2* is a position location calculating device" Page 4, ¶ 1, l. 1.
to generate a table identifying individual cellular telephone signals and the differences in times of arrival of said cellular telephone signals among said cell site systems;	Kono teaches software and processors in hardware unit 54 that determine and format time of arrival information. "reports to the switching station *1* via the control devices ***11a – 11n*** data such as the difference in arrival time of position locating signals with respect to the various base stations ***3a – 3n***." Page 4, ¶ 2, ll. 21-23.
and means for determining, on the basis of said times of arrival differences, the locations of the cellular telephones responsible for said cellular telephone signals.	"The base station *1* forwards these data to the position location calculating device *2*, and the position of the mobile equipment *5* is calculated." Page 4, ¶ 2, ll. 23-25.

Claim Language	Kono Invalidates the Asserted Claim
2. A cellular telephone location system as recited in claim 1,	See the above claim chart for claim 1.
wherein said timing signal receiver comprises a global positioning system (GPS) receiver.	Kono teaches software and processors in hardware unit 54 that determine and format time of arrival information. "reports to the switching station *1* via the control devices ***11a – 11n*** data such as the difference in arrival time of position locating signals with respect to the various base stations

Claim Language	Kono Invalidates the Asserted Claim
	3a – 3n." Page 4, ¶ 2, ll. 21-23.

Claim Language	Kono Invalidates the Asserted Claim
22. A ground-based cellular telephone system serving a plurality of subscribers possessing mobile cellular telephones, comprising:	All of figure 1 and the accompanying description. *See also* page 2, ¶ 2-Page 3, ¶ 1 ("FIG. 4 shows…control device 3c terminate operation.").
(a) at least three cell sites ;	Base stations 3a-3n.
equipped to receive signals sent by multiple mobile cellular telephones	Control channel transceivers 12a-12n.
each initiating periodic signal transmissions	The mobile cellular telephones taught by Kono each initiate periodic signal transmissions.
over one of a prescribed set of reverse control channels	"*12a – 12n* are control channel transceivers that transmit and receive signals for the control channels allotted for each of the base stations *3a – 3n.*" Page 2, ¶ 2, ll. 5-6.
(b) locating means for automatically determining the locations of said cellular telephones by receiving and processing signals emitted during said periodic reverse control channel transmissions; and	Kono teaches software and processors in hardware unit 55 that determine and format time of arrival information. "The standard clock *54* is an ultra-high precision clock, and the time measurement circuit *53* measures the absolute time of the above-mentioned trigger, and reports it to the switching station *1* from the control circuit *55* via the control device *11.* " Page 5, ¶ 3. ll. 13-15. "reference numeral *2* is a position location calculating device" Page 4, ¶ 1, l. 1. "The base station *1* forwards these data to the position location calculating device *2*, and the position of the mobile equipment *5* is calculated." Page 4, ¶ 2, ll. 23-25.

Claim Language	Kono Invalidates the Asserted Claim
(c) database means for storing location data identifying the cellular telephones and their respective locations, and for providing access to said database to subscribers at remote locations.	"reports to the switching station *1* via the control devices *11a – 11n* data such as the difference in arrival time of position locating signals with respect to the various base stations *3a – 3n*." Page 4, ¶ 2, ll. 21-23.

Claim Language	Kono Invalidates the Asserted Claim
31. A method for determining the location(s) of one or more cellular telephones each	All of figure 1 and the accompanying description. *See also* page 2, ¶ 2-Page 3, ¶ 1 ("FIG. 4 shows…control device 3c terminate operation.").
initiating periodic signal transmissions over one of a prescribed set of reverse control channels, comprising the steps of:	"*12a – 12n* are control channel transceivers that transmit and receive signals for the control channels allotted for each of the base stations *3a – 3n*." Page 2, ¶ 2, ll. 5-6. The mobile cellular telephones taught by Kono each initiate periodic signal transmissions.
(a) receiving said reverse control channel signals at least three geographically separated cell sites;	"*12a – 12n* are control channel transceivers that transmit and receive signals for the control channels allotted for each of the base stations *3a – 3n*." Page 2, ¶ 2, ll. 5-6.
(b) processing said signals at each cell site to produce frames of data,	Kono teaches software and processors in hardware unit 55 that determine and format time of arrival information. "where reference numeral *2* is a position location calculating device" Page 4, ¶ 1, l. 1.
each frame comprising a prescribed number of data bits and time stamp bits,	Kono teaches software and processors in hardware unit 55 that determine and format time of arrival information. "The standard clock *54* is an ultra-high precision clock, and the time measurement circuit *53* measures the absolute time of the above-mentioned trigger, and reports it to the switching station *1* from the control circuit *55* via the control device *11*. " Page 5, ¶ 3. ll. 13-15.
said time stamp bits representing the time at which said frames were produced at each cell site;	"The standard clock *54* is an ultra-high precision clock, and the time measurement circuit *53* measures the absolute time of the above-mentioned trigger, and reports it to the

Claim Language	Kono Invalidates the Asserted Claim
	switching station *1* from the control circuit *55* via the control device *11.* " Page 5, ¶ 3. ll. 13-15.
(c) processing said frames of data to identify individual cellular telephone signals and the differences in times of arrival of said cellular telephone signals among said cell sites; and	Kono teaches software and processors in hardware unit 54 that determine and format time of arrival information. "reports to the switching station *1* via the control devices ***11a – 11n*** data such as the difference in arrival time of position locating signals with respect to the various base stations *3a – 3n*." Page 4, ¶ 2, ll. 21-23.
determining, on the basis of said times of arrival differences, the locations of the cellular telephones responsible for said cellular telephone signals.	"The base station *1* forwards these data to the position location calculating device *2*, and the position of the mobile equipment *5* is calculated." Page 4, ¶ 2, ll. 23-25.

Claim Language	Kono Invalidates the Asserted Claim
32. A method as recited in claim 31,	See the above claim chart for claim 31.
further comprising the steps of storing, in a database, location data identifying the cellular telephones and their respective locations, and providing access to said database to subscribers at remote locations.	"reports to the switching station *1* via the control devices ***11a – 11n*** data such as the difference in arrival time of position locating signals with respect to the various base stations *3a – 3n*." Page 4, ¶ 2, ll. 21-23.

* * *

Andrew reserves the right to supplement, modify and/or amend its answer to this interrogatory.

Dated: November 8, 2006

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